A COMPARATIVE STUDY BETWEEN EFFECTS OF ELECTRICAL STIMULATION AND STRAPPING VERSUS SHOULDER SLING IN PREVENTION OF SHOULDER SUBLUXATION AND PAIN IN ACUTE HEMIPLEGIC PATIENTS

A Dissertation Submitted In Partial Fulfillment of the Requirements for the Degree of

MASTER OF PHYSIOTHERAPY

With Specialization In

ADVANCED PHYSIOTHERAPY IN NEUROLOGY

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Submitted to

THE TAMILNADU DR. M.G.R MEDICAL UNIVERSITY
Chennai

JKK MUNIRAJAH MEDICAL RESEARCH FOUNDATION

COLLEGE OF PHYSIOTHERAPY

Department Of Post Graduate Studies
Komarapalayam - 638 183

April - 2011

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Principal,
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“ALL THINGS ARE POSSIBLE WITH GOD”

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INTRODUCTION

Stroke is defined as a rapidly developing syndrome with clinical signs of focal or global disturbance of cerebral function with symptoms lasting 24 hours or longer or leading to death with no apparent cause other than vascular origin.

Stroke is the third leading cause of death and to most common cause of disability among adults in United States. It affects approximately 6,00,000 individuals each year with an estimated number of 4,00,000 stroke survivors. The incidence of stroke increases dramatically with age, doubling every decade after 55 years of age. In India the stroke prevalence rate is the range of 200 per 1,00,000 populations.

Two types of strokes: 1.Ischemic stroke, 2. Haemorrhagic stroke

Ischemic stroke: 1. Thrombotic stroke (40%), 2. Embolic stroke (30%), 3. lacunar stroke (20%)

Haemorrhagic stroke: Intra cerebral Haemorrhage, and sub-arachanoid Haemorrhage. The clinical features of stroke are : sudden numbness (or) weakness of face, arm, leg on one side of the body, sudden confusion, trouble in speaking (or) understanding speech, sudden trouble in walking, dizziness, loss of balance (or) co-ordination, severe headache with unknown cause.

The recovery of a patient with hemiplegia represents a great challenge not only due to the complexity of the last functions, but also the

high incidence of shoulder pain resulting in a negative impact during the rehab process.

Shoulder pain occurs in 34% to 85%of patients, regardless of age, gender and its onset typically takes place in the second week post stroke. The beginning of hemiplegia can compromise the normal biomechanical principles and the stability of shoulder complex due to the loss of motor control, the development of abnormal movement patterns and misalignment of the gleno humeral joint.

Shoulder subluxation found in 30 to 40% of the hemiplegic patients, the main clinical factors related to subluxation were 1.motor 2.spasticity of shoulder adductors 3.age-loss of elasticity of the periaricular tissues when ageing could have a protective role 4.mishandling.

Shoulder pain causes considerable distress and reduced activity and can markedly hinder rehabilitation. Muscular support of the humeral head in the glenoid fossa by the supraspinatus and deltoid muscles is lost. This leads to downward and outward subluxation of the humeral head, with the only support coming from the joint capsule.

The treatment starts with prevention of shoulder subluxation by 1.proper handling 2.positioning 3.straping 4.Electrical stimulation.5.Use of external supports like vernay brace, slings to prevent shoulder subluxation, bobath and PNF with conventional physiotherapy treatment to reduce pain and increase the range of motion of the shoulder joint.

AIMS AND OBJECTIVES

AIM OF THE STUDY

To compare the effectiveness of Electrical Stimulation with Strapping versus Shoulder Sling in the management of Hemiplegic shoulder subluxation and pain.

OBJECTIVES OF THE STUDY

- To determine the effectiveness of Electrical Stimulation with Strapping in the management of Hemiplegic shoulder subluxation and pain.

- To determine the effectiveness of Shoulder Sling in the management of Hemiplegic shoulder subluxation and pain.

- To determine the effectiveness of Electrical Stimulation with Strapping versus Shoulder Sling in the management of Hemiplegic shoulder subluxation and pain.

HYPOTHESIS

NULL HYPOTHESIS

The null hypothesis states that there was no significant difference between Electrical Stimulation with Strapping versus Shoulder Sling in the management of Hemiplegic shoulder subluxation and pain.

ALTERNATE HYPOTHESIS

The alternate hypothesis states that there was significant difference between Electrical Stimulation with Strapping versus Shoulder Sling in the management of Hemiplegic shoulder subluxation and pain.

REVIEW OF LITERATURE

1. Linn SL., et . al., (1999)

The aim of this study was to find out the effect of electrical stimulation in prevention of shoulder subluxation in hemiplegics patients. A propespective, randomized controlled study was to determine the efficacy of electrical stimulation in preventing shoulder subluxation in patients after cerebrovascular accidents. Fourty patients were selected and randomly assigned to a control and treatment group. They had their first assessment within 48 hours of their stroke, and those in the treatment group were immediately put on a regimen of electrical stimulation for 4 weeks. All patients were assessed at 4 weeks after stroke and then again at 12 weeks after stroke. Assessments were made of subluxation, pain and motor control.

The study concluded electrical stimulation can prevent shoulder subluxation, pain in hemiplegic patients.

2. Ada L, et. al., (2002)

The purpose of this mete analysis was to examine the efficacy of surface electrical stimulation for the prevention or reduction of shoulder subluxation after stroke. A mete analysis of all eligible randomized or quasi-randomized trials of electrical stimulation for the treatment of shoulder subluxation identified by computerized and hand searches of the literature was carried out. The primary outcome measure of interest was subluxation. Seven trials met the inclusion criteria, the mean PEDro score out of 10 for

quality of the methods was 5.8 for the four early trials and 4.3 for the three late trials. Data were pooled when subluxation was measured in millimeters. Analysis found that, when added to conventional therapy, electrical stimulation prevented on average 6.5mm of shoulder subluxation but only reduced it by 1.9mm compared with conventional therapy alone. The study concluded that the electrical stimulation can prevent shoulder subluxation, pain in hemiplegic patients.

3. S. Chinda, et. al.,

The main aim of this study was to evaluate and compare the actions of both the low frequency and medium frequency current on a shoulder subluxation and subsequent discomfort caused by hemiplegia. In an electrical stimulation using the medium frequency current, it was possible to obtain sufficient muscle contraction without any discomfort, because the impedance of the medium frequency current was much lower than that of the low frequency current. There was no improvement of the subluxation after 5 weeks of therapeutic electrical stimulation, however the discomfort disappeared. Medium frequency current is useful as an electrical stimulation, and therapeutic electrical stimulation using the medium frequency current is beneficial to discomfort in a hemiplegic shoulder with subluxation.

The study concluded that the use of medium frequency current is useful in preventing shoulder subluxation in hemiplegic patients.

4. Colleen Peterson

The aim of this study was to evaluate and compare the effects of electrical stimulation and taping with other rehabilitation. This case report describes the examination, intervention and outcome of a patient with central cord syndrome who participated in acute rehabilitation that included the use of electrical stimulation and strapping to address shoulder subluxation.

The patient was a 29 year old man with CCS and bilateral shoulder subluxation. He received ES over 8 weeks to the anterior and middle deltoid and supraspinatus muscles of the right shoulder. Taping was repeated every 3to 4 days on shoulders following over the anterior and middle deltoid muscles up to the acromion. The initial shoulder subluxation measurements were 1.5cm on the right and 1.0cm on the left. The final measurements were 0.3cm on the right and 0.2cm on the left. The patient's American spinal injury Association upper-extremity motor scores were 26/50 initially and 48/50 at discharge.

The study concluded the use of ES and shoulder taping in conjuction with other rehabilitation may have played a role in reducing the patient's shoulder subluxation.

5. Andrews (2009)

The aim of this study was to find out the effect of electrical stimulation for reducing shoulder subluxation in patients after stroke.

The author says that ES increases the synthesis of contractile protein, increased number of cross-bridges formed in fibers with voluntary activation so results in increased size of muscle fiber or hypertrophy. By increasing the local blood flow and relaxing the muscle spasm it reeducate the muscle. Electrical stimulation at a frequency of >30pps, with moderate pulse duration 150-200us and 25-30 contractions per session. The treatment session starts with 30 minutes and increased up to 6-8 hours/day.

This study concluded the use of ES in preventing the shoulder subluxation in stroke patients.

6. HC Hanger, et. al.,

The aim of this study was to determine whether strapping the shoulder in hemiplegic patients 1) prevents the development or reduce the severity of shoulder pain. 2) Preserves range of movement in the shoulder 3) improves the functional outcomes for the arm and patient overall. The author designed a prospective, randomized, single-blind controlled trial of shoulder strapping versus no strapping in care of the elderly wards in a teaching hospital, newzeland. All patients admitted with an acute hemiplegic stroke, who had persisting weakness of shoulder abduction included. The treatment group had their affected shoulder strapped for six weeks from randomization in addition to standard physiotherapy.

A visual analogue scale (VAS) was used to assess shoulder pain severity whereas shoulder range of movement to a point of pain (SROMP) assessed passive range of movement and pain. Functional Independence

Measure (FIM), Motor Assessment Scale (MAS), Rankin Disability Index measured functional outcomes.

This study concluded that shoulder strapping did not alter the range of movement.

7. Fil A, et .al., (2010)

The aim of this study was to find out the efficiency of electrical stimulation in combination with Bobath techniques in prevention of inferior and anterior shoulder subluxation in acute hemiplegic patients.

Forty –eight patients with acute stroke, divided equally into control and study groups. Subjects in both groups were treated in accordance with the Bobath concept and electrical stimulation to the supra spinatus muscle, mid and posterior portions of the deltoid muscle to the patients in the study group.

Two radiological methods were used to measure the horizontal, vertical and total asymmetry and vertical distance values of the shoulder joint. Motor functions of the arm were evaluated with the Motor Assessment Scale. Shoulder subluxation occurred in 9 subjects in the control group, whereas it was not observed in the study group. All shoulder joint displacement values were higher in the control group than in the study group

This study concluded that the application of electrical stimulation combined with the Bobath approach proved to be efficient in preventing

inferior and anterior shoulder subluxation in acute stages of stroke.

8. Piyapat Dajpratham, et. al., (2006)

The aim of this study was to assess the efficacy of the two types of shoulder slings in reducing shoulder subluxation in acute patients. 21 acute stroke patients with shoulder subluxation were assessed for the subluxation distance before and after wearing the slings by physical examination and radiological measurement were performed by two radiologists.

This study concluded that there was no difference in efficiency of shoulder sling in reducing shoulder subluxation in acute stroke patients.

9. Lockwood.C, et. al., (2003)

The aim of the study was to evaluate the role of slings in preventing shoulder subluxation and pain in acute stroke patients.

It has been suggested that if stretching of the joint capsule can be avoided during the acute and flaccid phases of CVA recovery, most patients would develop sufficient muscular activity to maintain glenohumeral alignment. This shoulder support may be provided through the use of slings and other support devices. One quasi randomized controlled trail and no significant difference was found for range of motion, shoulder pain or subluxation.

This study concluded that there was no difference in efficiency of shoulder sling in reducing shoulder subluxation in acute stroke patients.

10. Amy Griffin, et. al.,

The aim of the study was to evaluate, whether strapping (therapeutic or placebo) the ‘at risk’ shoulder prevented or delayed development of hemiplegic shoulder pain better than standard care.

Here 33 patients were included and strapping was maintained for four weeks. The primary outcome was number of pain free days measured on Ritchie Articular Index. Only one patient in the therapeutic strapping group developed pain and had a mean of 26.2 pain free days, while those in the placebo group and control group had a mean of 19.1 and 15.9 pain free days respectively.

This study concluded that therapeutic strapping limited development of hemiplegic shoulder pain during rehabilitation in at risk stroke patients.

MATERIALS AND METHDOLOGY

MATERIALS

- Electrical stimulator
- Electrodes and pads
- Pillow.
- Couch
- Lint cloth
- Leads
- Adhesive tap
- Cotton
- Strap
- Powder
- Arm sling

METHODOLOGY

Study Design

Quasi Experimental Study Design.

Study Setting

The study was conducted at out patient department in J.K.K. Munirajah Medical Research Foundation College of Physiotherapy, Komarapalayam and District Head Quarters Hospital, Erode under the supervision of the concerned authorities

Sampling Method

Convenient sampling method.

Sample Size

Thirty patients with Hemiplegic Shoulder subluxation and pain, who comes under the inclusion criteria, were taken for the study.

Study Duration

The study was conducted for a course of 6 weeks.

Inclusion Criteria

- Age group: 40-60 years.
- Both sexes.
- Both sides
- Ischemic and Hemorrhagic Stroke

Exclusion Criteria

- Musculo skeletal problem at shoulder (sprain and strain)
- Fractures at shoulder joint
- Psychiatric patients
- Degenerative diseases
- Hemiplegia results from traumatic brain injury (TBI), space occupying lesion.
- Any shoulder pathology (Recurrent shoulder subluxation)

Parameters

- Visual Analogue Scale
- Fugl-meyer assessment of physical performance (upper extremity)

Technique

Electrical Stimulation with Strapping

- Positioning
- Proper handling
- Preparing the Treatment area
- Electrical stimulation
- Strapping

Shoulder Sling

- Positioning
- Proper handling
- Shoulder sling

PROCEDURE:

A total number of 30 patients having Hemiplegic Shoulder subluxation and pain, who met the inclusion criteria were recruited by convenient sampling method. After the informed consent obtained, they were partitioned into two groups as Group A and Group B, with 15 patients in each.

Hence prior to the onset of treatment, pre-tests were conducted using Visual analogue Scale and Fugl-meyer assessment of physical performance (upper extremity) the results were recorded for both groups.

After a demonstration about Shoulder Sling, Group A subjects were subjected to Shoulder Sling for a period of 6 weeks.

After a demonstration about Electrical Stimulation with Strapping, Group B subjects were subjected to Electrical Stimulation with Strapping, with supervised for a period of 6 weeks.

Finally, a post test was conducted using Visual analogue Scale and Fugl-meyer assessment of physical performance (upper extremity) the results were recorded.

Statistical Tool

The statistical tools used in the study were paired ‘t’ test and unpaired ‘t’ test.

Paired‘t’ test:

The paired‘t’ test was used to find out the statistical significance between pre and post test of patients treated with Shoulder Sling versus Electrical Stimulation with Strapping in the management of Hemiplegic shoulder subluxation and pain.

Formula: Paired‘t’ test:

$$s = \sqrt{\frac{\sum d^2 - \frac{(\sum d)^2}{n}}{n-1}}$$

$$t = \frac{\bar{d}\sqrt{n}}{s}$$

d = difference between pre test Vs post test values

$\bar{d}$ = mean difference

n = total number of subjects

s = standard deviation.

Unpaired‘t’ test:

The unpaired‘t’ test was used to compare the statistically significant difference between Group A and Group B.

Formula: Unpaired ‘t’ test:

$$s = \sqrt{\frac{(n_1 - 1)s_1^{\,2} + (n_2 - 1)s_2^{\,2}}{n_1 + n_2 - 2}}$$

$$t = \frac{\left|\bar{x}_1 - \bar{x}_2\right|}{s\sqrt{{}^1/_{n_1} + {}^1/_{n_2}}}$$

n_1 = total number of subjects in group A

n_2 = total number of subjects in group B

x_1 = difference between pre test Vs post test of group A

$\bar{x}_1$ = mean difference between pre test Vs post test of group A

x_2 = difference between pretest Vs post test of group B

$\bar{x}_2$ = mean difference between pre test Vs post test of group B

s = standard deviation

DATA PRESENTATION

TABLE I

S.No	Group A (shoulder sling)				Group B(Electrical stimulation with strapping)			
	Visual Analogue Scale		Fugl-meyer scale		Visual Analogue Scale		Fugl-meyer scale	
	Pre	**Post**	**Pre**	**Post**	**Pre**	**Post**	**Pre**	**Post**
1.	8	5	40	46	8	4	42	51
2.	8	5	34	40	8	5	36	45
3.	9	5	38	45	7	3	42	53
4.	7	6	36	43	8	2	39	50
5.	6	5	40	47	7	2	42	52
6.	8	4	42	47	8	4	40	54
7.	7	5	39	47	8	5	41	53
8.	8	6	41	49	8	3	44	55
9.	8	6	40	48	8	2	40	51
10.	8	5	35	44	7	2	39	48
11.	6	4	40	45	8	4	35	46
12.	8	6	44	51	7	2	43	55
13.	6	5	38	47	8	3	38	51
14.	8	6	33	50	7	4	40	52
15.	7	5	40	48	7	3	44	56

DATA ANALYSIS AND INTERPRETATION

GROUP –A

The comparative mean value, mean difference, standard deviation and paired "t" values between pre Vs post test of visual analogue scale for pain in group A.

TABLE-II

S.No	Test	Improvement			Paired t-Value
		Mean	Mean Difference	S.D	
1.	Pre test	7.47	2.27	3.59	9.1336
2.	Post test	5.20			

The paired t-value of 9.133 was greater than the tabulated paired t-value of 2.14 which showed that there was statistically significant difference at 0.05 level between pre Vs post test result. The pre test mean was 7.47 and the post test mean was 5.20 and the mean difference was 2.27 which showed that there was significant reduction in pain score and shoulder subluxation in response to shoulder sling in hemiplegic patients.

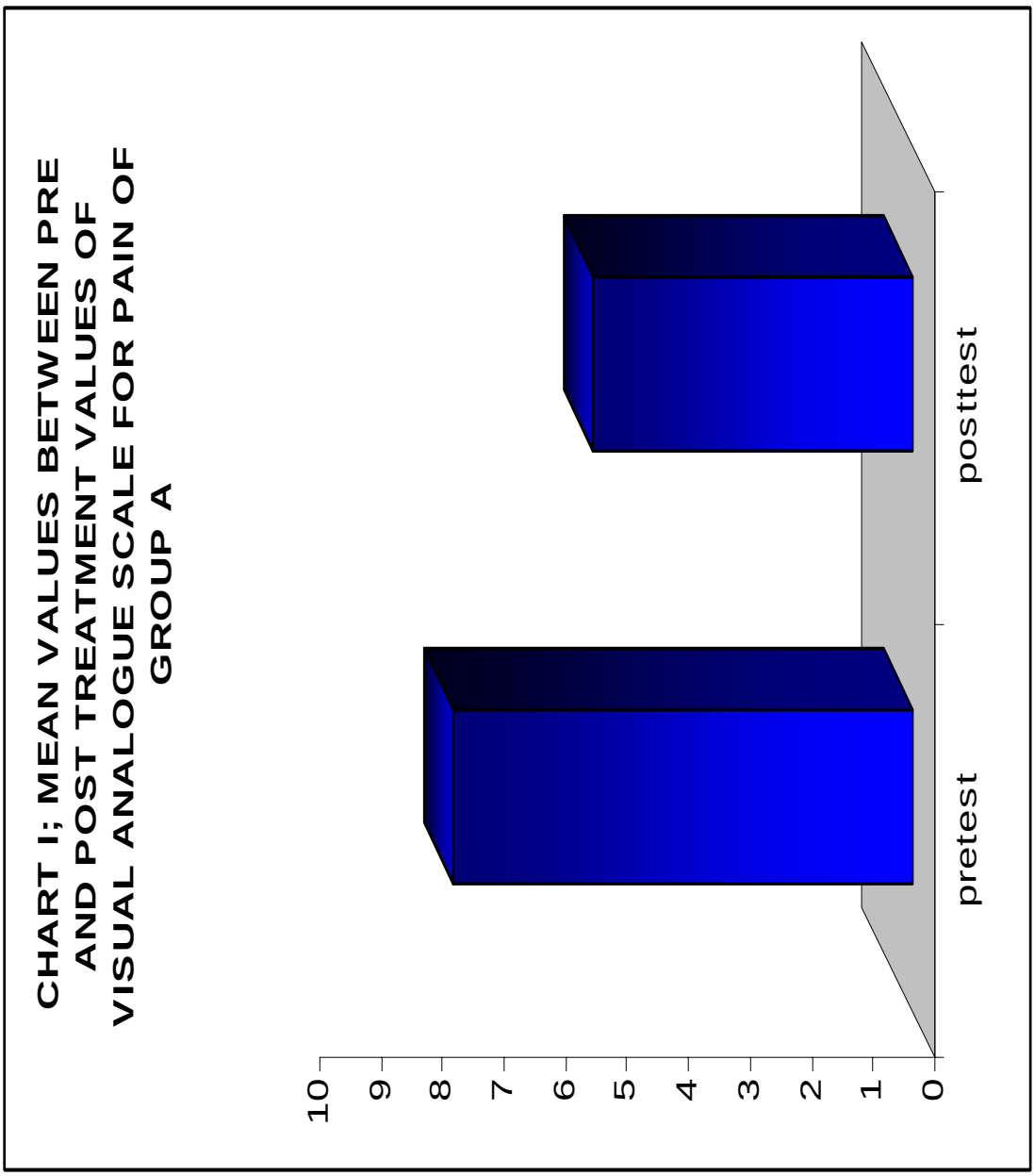


CHART I; MEAN VALUES BETWEEN PRE AND POST TREATMENT VALUES OF VISUAL ANALOGUE SCALE FOR PAIN OF GROUP A
10
9
8
7
6
5
4
3
2
1
0
pretest
posttest

GROUP –B

The comparative mean value, mean difference, standard deviation and paired “t” values between pre Vs post test of visual analogue scale for pain in group B.

TABLE-III

S.No	Test	Improvement			Paired t-Value
		Mean	Mean Difference	S.D	
1.	Pre test	7.60	4.40	3.59	17.2899
2.	Post test	3.20			

The paired t-value of 17.289 was greater than the tabulated paired t-value of 2.14 which showed that there was statistically significant difference at 0.05 level between pre Vs post test result. The pre test mean was 7.60 and the post test mean was 3.20 and the mean difference was 4.40 which showed that there was significant reduction in pain score and shoulder subluxation in response to electrical stimulation with strapping in hemiplegic patients.

CHART II: MEAN VALUES BETWEEN PRE AND POST TREATMENT VALUES OF VISUAL ANALOGUE SCALE FOR PAIN OF GROUP B

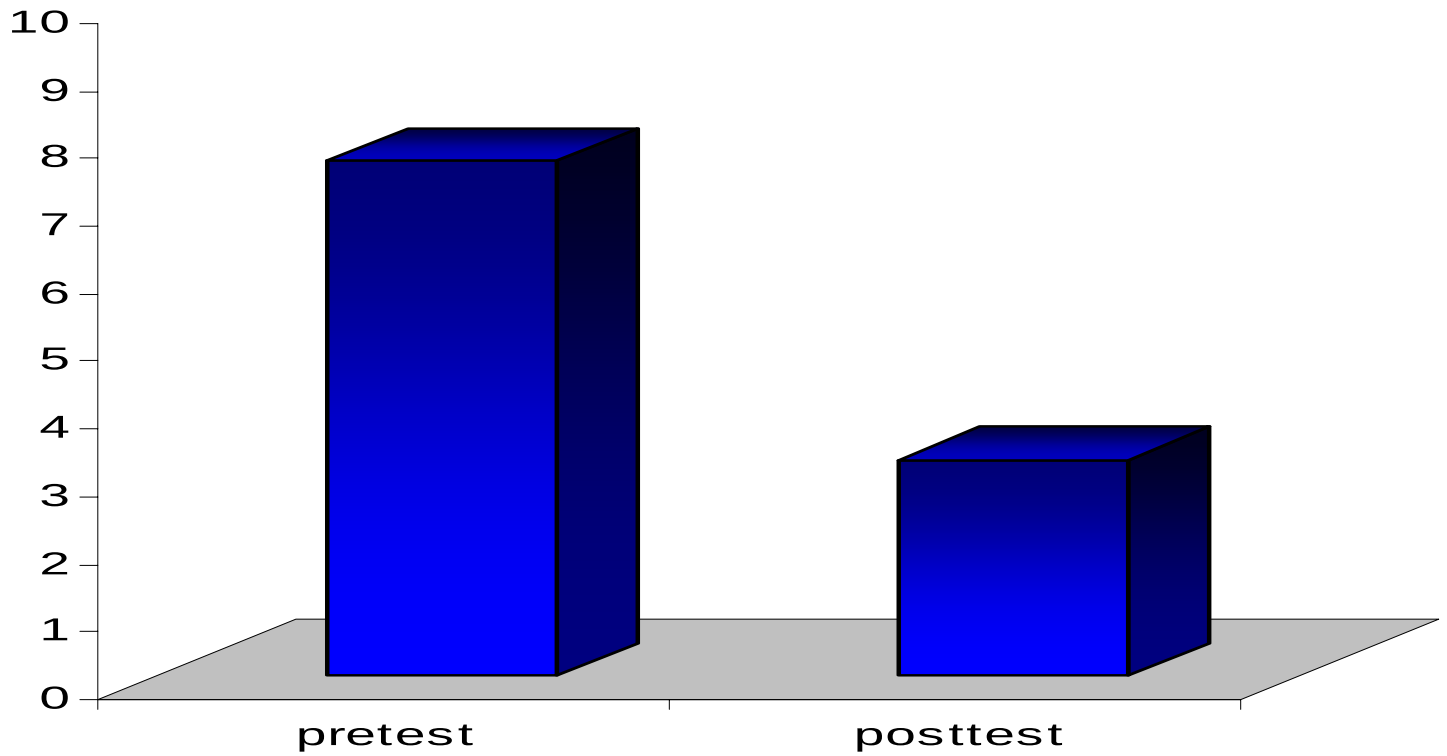


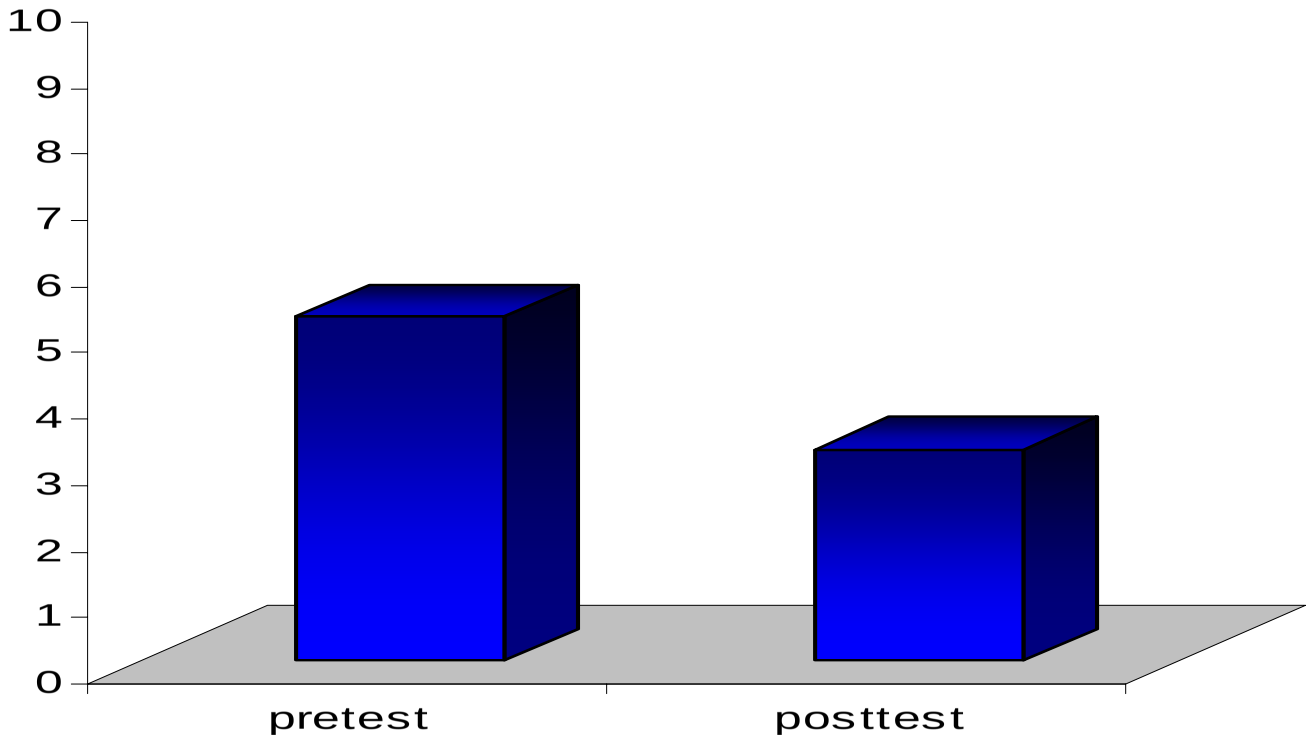
TABLE-IV

The comparative mean value, mean difference, standard deviation and paired “t” values between pre Vs post test of visual analogue scale for pain in group A and group B.

S.No	Test	Improvement			Unpaired t-Value
		Mean	Mean Difference	S.D	
1.	Group A	5.20	2	2.23	6.0698
2.	Group B	3.20			

The paired t-value of 6.0698 was greater than the tabulated paired t-value of 2.05 which showed that there was statistically significant difference group A and group B. The Pre Vs post test mean of group A was 5.20and The Pre Vs post test mean of group B was 3.20 and the mean difference of group A and group B was 2 which showed that there was significant reduction in pain and shoulder subluxation in response to treatment in group B when compared to group A.

CHART III: MEAN VALUE BETWEEN PRE AND POST TREATMENT VALUES OF VISUAL ANALOGUE SCALE OF GROUP A & GROUP B



GROUP A

The comparative mean value, mean difference, standard deviation and paired t-values between pre test Vs post test values of Group A by using Fugl-meyer Scale

Table V

S.No	Test	Mean	Mean Difference	S.D	Paired t-value
1.	Pre test	39.33	6.67	1.24	22.3
2.	Post test	46			

The paired t-value 22.3 was greater than the tabulate paired t-value of 2.14 Which showed that there was statically significant difference at 0.05 level between pre and post result. The pre test mean was 39.33 and the post test mean was 46 and the mean difference was 6.67 which showed that there was statistically significant in shoulder sling in shoulder subluxation in hemiplegic patients.

CHART IV: COMPARITIVE MEAN VALUE BETWEEN PRE TEST AND POST TEST VALUES OF GROUP A BY USING FUGL-MEYER SCALE

GROUP B

The comparative mean value, mean difference, standard deviation and paired "t" values between pre test Vs post test values of group B by using Fugl-meyer scale.

Table VI

S.No	Test	Mean	Mean Difference	S.D	Paired t-value
1.	Pre test	40.3	11.17	1.5	28.87
2.	Post test	51.47			

The paired t-value 28.87 was greater than the tabulated paired t-value of 2.14 which showed that there was statistically significant difference at 0.05 levels between pre and post result. The pre test mean was 40.3 and the post test mean was 51.47 and the mean difference was 11.17 which showed that there was statistically significant in electrical stimulation with strapping in hemiplegic patients.

CHART V: COMPARITIVE MEAN VALUE BETWEEN PRE TEST AND POST TEST VALUES OF GROUP B BY USING FUGL-MEYER SCALE

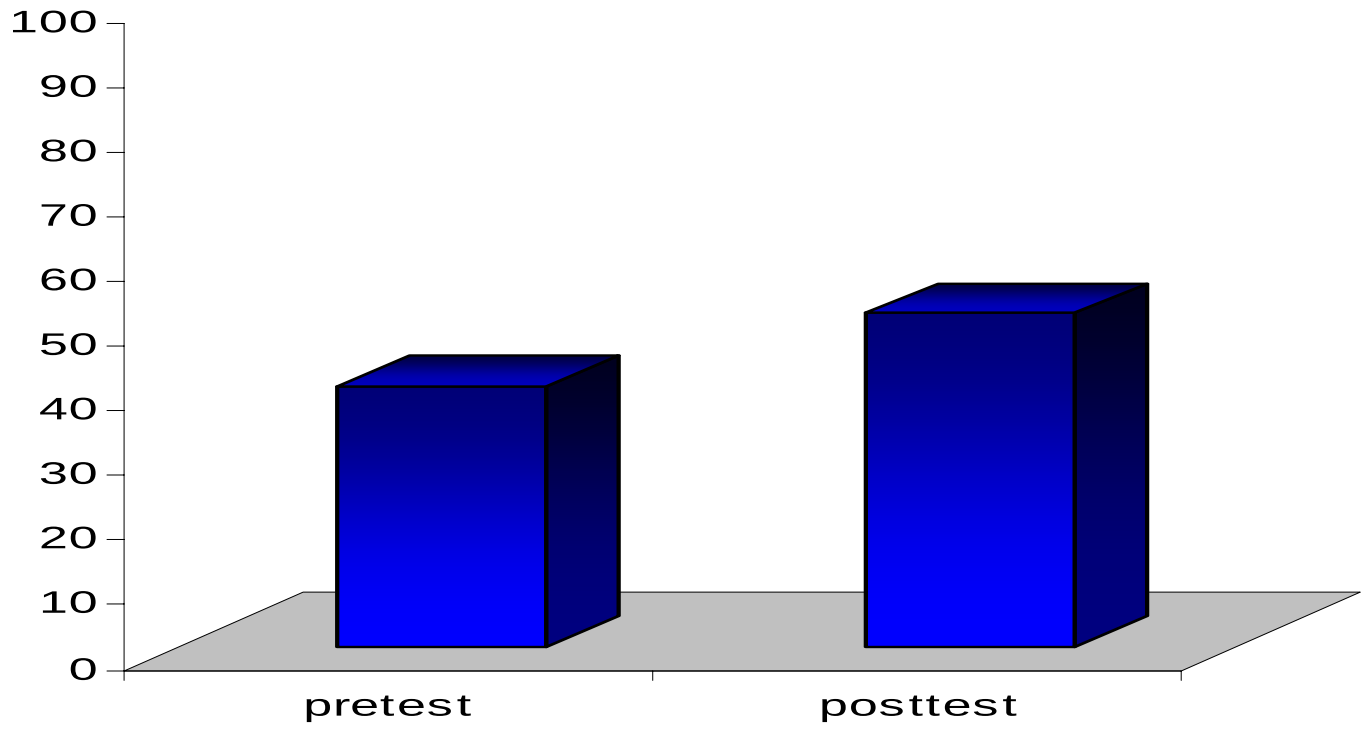


Table VII

The comparative mean value, mean difference, standard deviation and unpaired t-values between Group A and Group B.

S.No	Test	Mean	Mean Difference	S.D	Unpaired t-value
1.	Pre test	11.7	4.5	3.1	4.78
2.	Post test	6.67			

The unpaired t-value 4.78 was greater than the tabulated unpaired t-value of 2.05 which showed that there was statistically significant difference at 0.05 level between the mean difference of GroupA and GroupB. The Pre Vs Post test mean of Group A was 6.67 Pre Vs Post test mean of Group B was 11.17 and and the mean difference of Group A and Group B was 4.5 which showed that there was statistically significant improvement in shoulder subluxation in hemiplegic patients in response to treatment in Group B when compared to Group A.

Therefore the study accepting the alternate hypothesis and rejecting the null hypothesis.

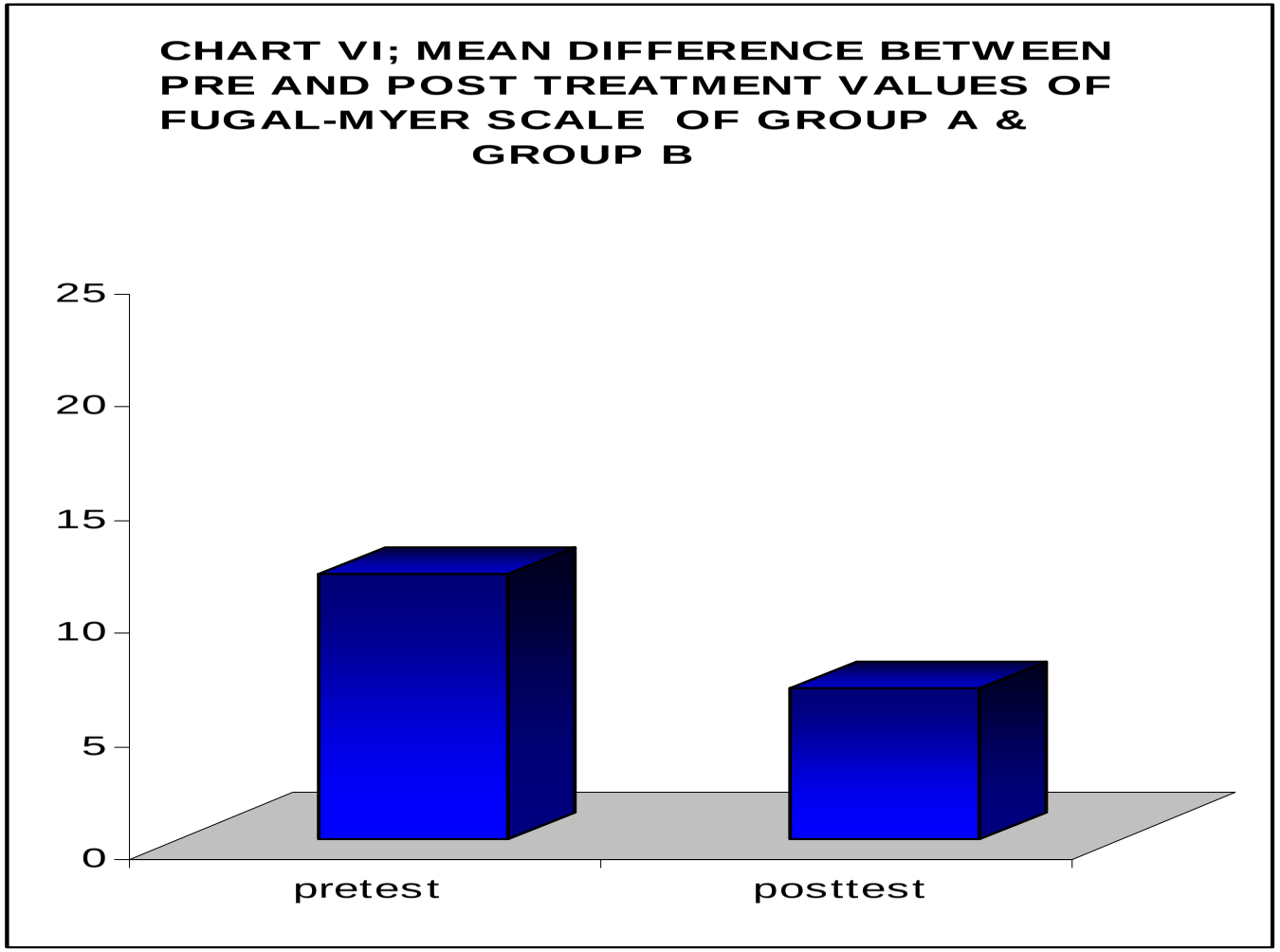


CHART VI; MEAN DIFFERENCE BETWEEN PRE AND POST TREATMENT VALUES OF FUGAL-MYER SCALE OF GROUP A & GROUP B
25
20
15
10
5
0
pretest
posttest

DISCUSSION

The aim of the study was to compare the effectiveness of electrical stimulation with strapping versus shoulder sling in shoulder subluxation and pain in acute hemiplegic patients.

DAVID J. GLADSTONE et al: (2002)

The study revises the critical properties of the fugl-meyer scale. The fugl-meyer scale was developed as the first quantitative evaluative instrument for measuring sensory motor stroke recovery, based on Twitchell and Brunnstrom's concept of sequential stages of motor return in the hemiplegic stroke patient. The fugl–meyer was the well designed, feasible and efficient clinical examination method that has been tested widely in the stroke population. Its primary value is the 100-point motor domain, which has received the most extensive evaluation. Excellent interrater and intrarater reliability and construct validity have been demonstrated. Based on the available evidence, the fugl-meyer motor scale is recommended highly as a clinical and research school for evaluating changes in motor impairment following stroke.

Based on the above mentioned study Fugl-Meyer assessment scale was used as a parameter in the study.

LOUISE ADA AND ANCHALEE (2002)

This systematic review has demonstrated that there is evidence to support the efficacy of early electrical stimulation as an adjunct to conventional therapy for preventing shoulder subluxation and for increasing upper limb function, and of late electrical stimulation as an adjunct to conventional therapy in reducing pain. Electromyography studies show that supraspinatus and, to a lesser extent, posterior deltoid are key components in counteracting the inferior displacement of the glenohumeral joint (Basmajian and Bazant 1959, Chaco and Wolf 1971). Therefore, we included only trials that used stimulation frequencies greater than 30 Hz or Otherwise reported a motor response to electrical stimulation to ensure that muscle activity counteracted inferior displacement. Our findings indicate that there is a significant treatment effect of this type of electrical stimulation in preventing subluxation of about 6.5mm. Six-and-a-half millimeters of movement of the humeral head relative to the glenoid fossa is one sixth of the average height of the glenoid fossa (40mm) (McPherson et al 1997) and corresponds to a Grade 1 subluxation (van Langenberghe and Hogan 1988). In this review, we categorized trials into early and late electrical stimulation trials according to the average time after stroke to separate the effect of electrical stimulation for prevention versus reduction. In this method VAS and fugl-meyer scale were used to assess reduction of pain and functional improvement of the upper limb

Based on the above mentioned study Fugl-Meyer assessment scale and visual analogue scale were used as a parameter in the study.

IN THE ANALYSIS AND INTERPRETATION OF VISUAL ANALOGUE SCALE IN SHOULDER SLING TO IMPROVE SHOULDER SUBLUXATION AND TO REDUCE PAIN IN ACUTE HEMIPLEGIC PATIENTS (GROUP A)

The paired t-value 9.133was greater than the tabulated paired t-value of 2.14 which showed that there was statistically significant difference at 0.05level between pre and post result. The pre test mean was 7.47, and the post test mean was 5.20 and the mean difference was 2.27 which showed that there was statistically reduction in shoulder subluxation and pain with shoulder sling in hemiplegic patients.

IN THE ANALYSIS AND INTERPRETATION OF FUGL MEYER ASSESSMENT SCALE IN SHOULDER SLING TO IMPROVE SHOULDER SUBLUXATION (IMPROVE UPPER LIMB FUNCTION) AND TO REDUCE PAIN IN ACUTE HEMIPLEGIC PATIENTS (GROUP A)

The paired t-value 22.3 was greater than the tabulated paired t-value of 2.14 which showed that there was statistically significant difference at 0.05level between pre and post result. The pre test mean was 39.33 and the post test mean was 46 and the mean difference was 6.67 which showed that there was statistically significant reduction in shoulder subluxation and pain with shoulder sling in hemiplegic patients.

IN THE ANALYSIS AND INTERPRETATION OF VISUAL ANALOGUE SCALE IN ELECTRICAL STIMULATION WITH STRAPPING TO IMPROVE SHOULDER SUBLUXATION AND TO REDUCE PAIN IN ACUTE HEMIPLEGIC PATIENTS (GROUP B)

The paired t-value of 17.28 was greater than the tabulated paired t-value of 2.14 which showed that there was statistically significant difference at 0.05 level between pre and post result. The pre test mean was 7.6 and the post test mean was 3.2 and the mean difference was 4.40, which showed that there was statistically significant reduction in shoulder subluxation and pain with electrical stimulation with strapping in hemiplegic patients.

IN THE ANALYSIS AND INTERPRETATION OF FUGL MYER ASSESSMENT SCALE IN ELECTRICAL STIMULATION WITH STRAPPING TO IMPROVE SHOULDER SUBLUXATION(TO IMPROVE UPPER LIMB FUNCTION) AND TO REDUCE PAIN IN ACUTE HEMIPLEGIC PATIENTS(GROUP B)

The paired t-value 28.7 was greater than the tabulated paired t-value of 2.14 which showed that there was statistically significant difference at 0.05 level between pre and post result. The pre test mean was 40.3 and the post test mean was 51.47 and the mean difference was 11.17 which showed that there was statistically significant reduction in shoulder subluxation and pain with electrical stimulation with strapping in hemiplegic patients.

IN THE COMPARISON OF GROUP A AND GROUP B IN THE ANALYSIS AND INTERPRETATION OF VISUAL ANALOGUE SCALE OF GROUP A AND GROUP B

The unpaired t-value 6.069 was greater than the tabulated paired t-value of 2.05 which showed that there was statistically significant difference at 0.05 level between the mean difference of group A and group B. The pre Vs post test mean of group A was 5.20, and the pre Vs post test mean of group B was 3.20, and the mean difference of group A and group B was 2, which showed that there was statistically significant reduction in shoulder subluxation and pain in response to electrical stimulation and strapping in group B when compared to group A.

IN THE ANALYSIS AND INTERPRETATION OF FUGL MYER SCALE OF GROUP A AND GROUP B

The unpaired t-value 4.78 was greater than the tabulated paired t-value of 2.05 which showed that there was statistically significant difference at 0.05 level between the mean difference of group A and group B. The pre Vs post test mean of group A was 6.67 and the pre Vs post test mean of group B was 11.17 and the mean difference of group A and group B was 4.5 which showed that there was statistically significant reduction in shoulder subluxation and pain in response to electrical stimulation and strapping in group B when compared to group A.

Therefore the present study accepting alternate hypothesis and rejecting null hypothesis.

REASONS FOR REDUCTION OF SUBXATION AND PAIN BY SHOULDER SLING (GROUP A)

- Attempt to position the head of the humerus in glenoid fossa , so it reduce the shoulder subluxation between the head of the humerus and the acromion process.

- Limited the shoulder movement, injury to the neurovascular tissues around the shoulder joints.

REASON FOR REDUCTION OF PAIN AND SUBLUXTATION BY ELECTRICAL STIMULATION WITH STRAPPING (GROUP B)

- Electrical stimulation improves the muscle tone.
- Gives the analgesic effect through inducing contraction of the flaccid shoulder muscles and therefore preventing or treating subluxation.
- Gives pain free passive humeral lateral rotation and reduction in the severity of subluxation.
- It produced motor response resulted in an increase in function and a decrease in pain.
- Prevents shoulder subluxation by improving the deltoid and supraspinatus muscle.
- Strapping the shoulder in hemiplegic stroke patients,

a) Prevents the development or reduces the severity of Shoulder pain.

b) Preserves range of movement in the shoulder.

c) Improves the functional outcomes for the arm and patient overall.

d) Aid healing of shoulder injuries.

SUMMARY

The aim of the study was to compare the efficacy of electrical stimulation with strapping versus shoulder slings to improve shoulder subluxation and reduce pain in hemiplegic patients.

A total number of 30 subjects with hemiplegia were selected by convenient sampling method after due consideration to the inclusion and exclusion criteria.

Visual analogue scale and Fugal Meyer Assessment scale were taken as parameters to measure changes. The pre treatment data were collected for Group A& Group B subjects and computed.

Group A subjects were given shoulder slings and Group B were given electrical stimulation with strapping daily. The results of the same parameters were recorded for comparison after 6 weeks of treatment.

The paired “t” test was used to compare the pre versus post treatment result of Group A& Group B separately. The unpaired “t” test was used to compare the mean difference of Group A and Group B.

In the analysis and interpretation of visual analogue scale between Group A and Group B, the unpaired “t” value of 9.76 was greater than the tabulated “t” value of 2.05 which showed that there was statistically significant difference at 0.05 level between mean difference of Group A &

Group B. The mean value of Group B which was 1.8 which was lesser than the Group A value of 5.13 shows that there was significant decrease in pain in Group B compared to Group A in response to intervention.

In the analysis and interpretation of Fugal Meyer Scale between Group A and Group B, the unpaired “t” value of 4.78 was greater than the tabulated “t” value of 2.05 which showed that there was statistically significant difference at0.05 level between mean differences of Group A & Group B. The mean value of Group B which was 11.17 which was greater than the Group A value of 6.67 shows that there was significant decrease in shoulder subluxation and pain in Group B compared to Group A in response to intervention.

CONCLUSION

The result of the study concluded that there was reduction in shoulder subluxation and pain in acute hemiplegic after the treatment with electrical stimulation and strapping than with shoulder sling alone, and Visual Analogue Scale and Fugal-Meyer assessment scale could be used as the assessment tools for pain and upper limb function.

RECOMMENDATIONS

- This similar study can be conducted in central cord syndrome with shoulder subluxation.

- This similar study can be conducted in bilateral shoulder subluxation in stroke patients.

- This similar study can be conducted in traumatic shoulder subluxation.

- This similar study can be conducted in sports injury to the shoulder with subluxation.

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APPENDIX

APPENDIX - I

VISUAL ANALOGUE SCALE (VAS):

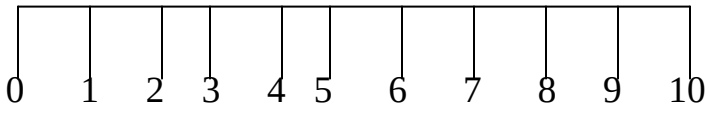
Visual or analogue scales attempt to represent measurement quantifies in terms of a straight line placed horizontally or vertically on paper.

The end points of the line are labeled with descriptive or numeric terms to anchor the extremes of the scale and provide a frame or reference for any point in the continuum between them.

The entire visual analogue line is 10 centimeter long.

The patient is instructed to mark the line at the point that corresponds to the degree of pain or severity of symptoms that are experienced.

No pain moderate pain severe pain



APPENDIX - II

Scoring sheet for Fugl-meyer assessment, devised from original paper (Fugl-meyer, et al., 1975)

	score		
1.SHOULDER/ELBOW/FOREARM			
1.1 Reflex activity			
Flexors(Biceps And Triceps)	0	1	2
Extensors(Triceps)	0	1	2
1.2 Flexors synergy- volitional movement within synergy			
Shoulder retraction	0	1	2
Shoulder elevation	0	1	2
Shoulder abduction	0	1	2
Shoulder external rotation	0	1	2
Elbow flexion	0	1	2
Forearm supination	0	1	2
1.3 Extensors synergy-volitional movement within synergy			
Shoulder adduction/internal rotation	0	1	2
Elbow extension	0	1	2
Forearm pronation	0	1	2
1.4 Volitional movement mixing the dynamic flexor and extensor strategies			

Hand on lumbar spine	0	1	2
Shoulder Flexion	0	1	2
Forearm pronation/supination	0	1	2
1.5 Volitional movement are performance with little or no synergy dependence			
Shoulder abduction	0	1	2
Shoulder flexion	0	1	2
Forearm pronation/supination	0	1	2
2. WRIST			
2.1 Wrist stability-elbow 90	0	1	2
2.2 Wrist flexion /extension-elbow 90	0	1	2
2.3 Wrist stability-elbow 0	0	1	2
2.4 Wrist flexion /extension-elbow 0	0	1	2
2.5 Circumduction	0	1	2
3. HAND			
3.1 Mass flexion	0	1	2
3.2 Mass extension	0	1	2
3.3 Grasp A – distal finger grasp	0	1	2
3.4 Grasp B – thumb adduction grasp	0	1	2
3.5 Grasp C – thumb to index finger grasp	0	1	2
3.6 Grasp D – cylindrical grasp	0	1	2
3.7 Grasp E – spherical grasp	0	1	2

4. CO-ORDINATION / SPEED			
4.1 Tremor	0	1	2
4.2 Dysmetria	0	1	2
4.3 Speed	0	1	2
Upper limb score			

0 – Unable to perform

1 – Able to perform in part

2 – Able to perform

APPENDIX – III

Technique:

SHOULDER STRAPPING IN SHOULDER SUBLUXATION

- Shoulder strapping techniques designed to support the shoulder and reduce stress.
- Begin this in good posture with the hand positioned on the hip.
- Strapping continued for 6 weeks.
- Prevents the development or reduces the severity of shoulder pain.
- Preserves range of movement in the shoulder.
- Improves the functional outcomes for the arm and patient overall.
- Aid healing of shoulder injuries.

Picture: III SHOULDER STRAPPING

APPENDIX – IV

ELECTRICAL STIMULATION

- Frequency-12 to 40 HZ
- Pulse width-300 to 350 ms.
- Goal- achieving tetanized contraction. (25-30contractions per session.)
- Electrodes- placed on the supraspinatus and deltoid muscles.
- Treatment time- increased from 0.5-6 hr/session, 2session/day, for 6 weeks.

Picture: II ELECTRICAL STIMULATION

APPENDIX – V

SHOULDER SLING

- Attempt to position the head of the humerus in glenoid fossa , so it reduce the shoulder subluxation between the head of the humerus and the acromion process.
- Limited the shoulder movement, injury to the neurovascular tissues around the shoulder joints.
- Sling had an arm cuff and vertical strap system to support the weight of the affected shoulder through the sound axilla.

Picture: I SHOULDER SLING

APPENDIX-VI

DEFINITIONS OF TERMS:

STROKE :

Characterized by acute onset of neurological dysfunction due to abnormality in cerebral circulation with resultant signs and symptoms that correspond to involvement of the focal areas of brain.

SUBLUXATION :

Defined as having a distance between ther head of the humerus and the acromion process of more than one fingerbreadth on physical examination, otherwise partial displacement of the head of the humerus from the glenoid cavity.

VAS :

A visual analogue scale for measuring pain or other symptoms. The patient is instructed to mark the line at the point that “corresponds to the degree of pain or severity of symptoms that are experienced”.

INFORMED CONSENT TO PARTICIPATE VOLUNTARY IN A RESEARCH INVESTIGATION

Name :

Age :

Sex :

Occupation :

Address for communication :

Declaration:

I have fully understood the nature and purpose of the study. I accept to be a subject in this study. I declare that the above information is true to my knowledge.

Date: Signature of the subject.

Place:

s

ASSESSMENT CHART

Name :

Age :

Sex :

Occupation :

Address for communication :

Chief complaint :

Mode of treatment : 1. shoulder sling.

2. Electrical stimulation with shoulder strapping

parameter	Before treatment	After treatment
Visual Analogue Scale		
Fugl-Meyer scale		

Signature of the investigator